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United States  
Department of  
Agriculture

Natural  
Resources  
Conservation  
Service



# Washington

## Basin Outlook Report

### January 1, 1996





# Basin Outlook Reports

## and Federal - State - Private Cooperative Snow Surveys

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### *How forecasts are made*

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Natural Resources Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated SNOTEL measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis and transmitted via meteor burst telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

Forecast uncertainty originates from two sources: (1) uncertainty of future hydrologic and climatic conditions, and (2) error in the forecasting procedure. To express the uncertainty in the most probable forecast, four additional forecasts are provided. The actual streamflow can be expected to exceed the most probable forecast 50% of the time. Similarly, the actual streamflow volume can be expected to exceed the 90% forecast volume 90% of the time. The same is true for the 70%, 30%, and 10% forecasts. Generally, the 90% and 70% forecasts reflect drier than normal hydrologic and climatic conditions; the 30% and 10% forecasts reflect wetter than normal conditions. As the forecast season progresses, a greater portion of the future hydrologic and climatic uncertainty will become known and the additional forecasts will move closer to the most probable forecast.

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# Washington Water Supply Outlook

January 1996

## General Outlook

January started off looking good with forecasts of much needed snow. However instead of 10 - 12 inches of forecasted mountain snow, Washington received light snow and then warm wet weather. Most SNOTEL sites in the state retained their current snowpack but several sites on the westside showed a decrease in snow. This was primarily caused from snow followed by rain. Rivers on the westside once again showed dramatic increases, reaching near flood stages and threatening already weak and damaged dikes and levees. Precipitation and temperature levels for the last thirty days have been above average. As expected snowpack accumulations have been below normal. Streamflow forecasts are for mostly normal summer runoff with a few streams forecast for slightly below normal.

## Snowpack

The January 1 statewide SNOTEL reading showed the snowpack to be 81% of average. Snowpack varied over the state, with the Walla Walla River basin SNOTEL reporting the lowest with 54% of average, and the Methow River Basin the highest at 118% of normal. Westside averages from SNOTEL and January 1 snow surveys include the North Puget River Basins with 63% of normal, the Olympic Basins with 63%, and the Lewis-Cowlitz basins with 56% of normal. Snowpack along the east slopes of the Cascade Mountains include the Yakima with 84%, and the Wenatchee with 92%. Snowpack in the Spokane River Basin was at 42%, and the Pend Oreille River Basin, including Canadian data, had 101% of normal. Maximum snow cover was at Lyman Lake SNOTEL in the north-central Cascade Mountains, with a water content of 28.4 inches. This site would normally have 25.8 inches of water content on January 1. High average in the state goes to Harts Pass SNOTEL near Winthrop with 151% of normal. The lowest snowpack was at the Spirit Lake SNOTEL near Mt. St. Helens with 0 inches of snow-water-equivalent. Spirit Lake normally has 2 inches on January 1.

BASIN	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Spokane.....	34.....	47
Colville.....	N/A.....	N/A
Pend Oreille.....	91.....	101
Okanogan.....	104.....	103
Methow.....	89.....	145
Wenatchee.....	51.....	92
Chelan.....	76.....	117
Yakima.....	47.....	84
Walla Walla.....	28.....	46
Cowlitz.....	43.....	73
Lewis.....	24.....	47
White.....	48.....	93
Green.....	26.....	47
North Puget Sound.....	36.....	63
Olympic Peninsula.....	43.....	63

## Precipitation

The National Weather Service and Natural Resources Conservation Service climate stations during the month of December showed near to much above normal precipitation across the state. The highest percent of average in the state was at Salmon Meadows SNOTEL site in Okanogan County. Salmon Meadows reported 182% of normal for a total of 4.0 inches. Normal for this site is 2.2 inches for December. Averages for the water year varied from 123% of normal in the Okanogan - Methow River Basins to 178% of normal in both the Yakima and North Puget Sound River basins. The highest average for the year is 263% of normal at Concrete in Skagit County.

BASIN	DECEMBER PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane.....	91.....	142
Colville-Pend Oreille.....	112.....	138
Okanogan-Methow.....	107.....	123
Wenatchee-Chelan.....	104.....	157
Yakima.....	129.....	178
Walla Walla.....	106.....	153
Cowlitz-Lewis.....	132.....	164
White-Green-Cedar.....	108.....	166
North Puget Sound.....	110.....	178
Olympic Peninsula.....	119.....	133

## Reservoir

Reservoir storage in Washington was generally above average for January 1. Reservoir storage in the Yakima Basin was 777,200 acre feet, 134% of normal. Storage at other reservoirs included Roosevelt at 103% of average, and the Okanogan reservoirs with 128% of normal for January 1. The power generation reservoirs include the following: Coeur d'Alene Lake, 146,500 acre feet, or 112% of normal; Chelan Lake, 629,500 acre feet, 166% of average and 93% of capacity; and Ross Lake at 161% of average and 90% of capacity. Greater than normal releases continue from most reservoirs across the state. These numbers may decline over the next few months in preparation for spring runoff and flood control.

BASIN	PERCENT OF CAPACITY	PERCENT OF AVERAGE
Spokane.....	61.....	112
Colville-Pend Oreille.....	91.....	104
Okanogan-Methow.....	73.....	128
Wenatchee-Chelan.....	93.....	166
Yakima.....	73.....	134
North Puget Sound.....	90.....	161



## Streamflow

Forecasts for summer streamflow are mostly for near to above average with a few streams below average. They vary from 125% of average for the Methow near Pateros to 80% of normal for the Cedar River at Cedar Falls. January forecasts for some Western Washington streams include: Cedar River near Cedar Falls, 86%; Green River, 85%; and the Dungeness River, 97%. Some Eastern Washington streams include Mill Creek at Walla Walla, 97%; the Wenatchee River at Peshastin, 112%; and the Colville River, 114%. December streamflows varied greatly throughout the state but were all well above normal. The Similkameen at Nighthawk was the highest at 483% of average; and the Lewis at Ariel, with 145% of normal, was the lowest in the state. Other streamflows were the following percentage of normal: the Cowlitz River, 187%; the Okanogan River, 383%; the Spokane River, 322%; the Columbia at the Canadian border, 211%, and the Yakima River at Kiona, 329%.

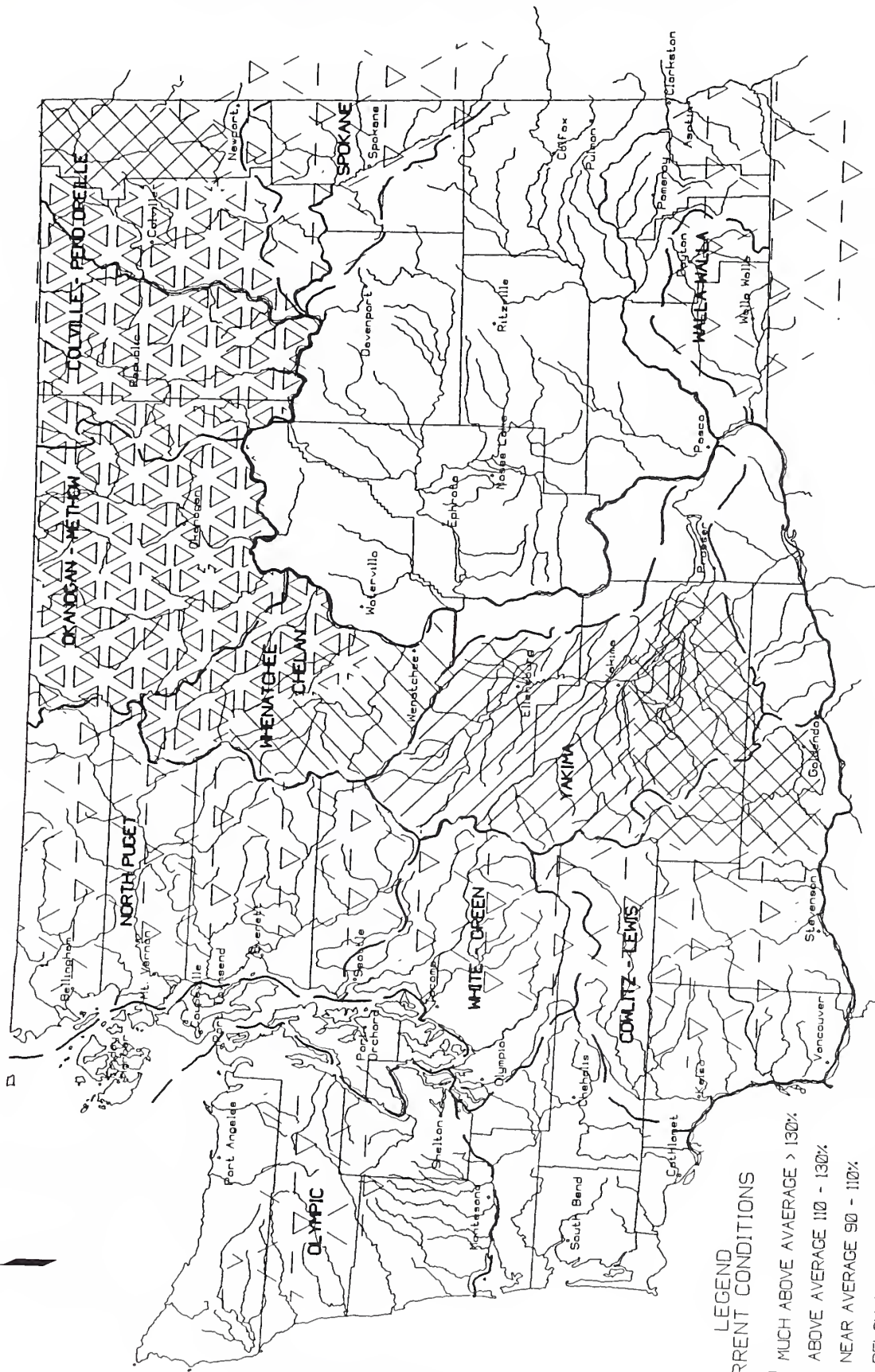
### BASIN

### PERCENT OF AVERAGE MOST PROBABLE FORECAST (50 PERCENT CHANCE OF EXCEEDANCE)

Spokane.....	88
Colville-Pend Oreille.....	91-120
Okanogan-Methow.....	88-125
Wenatchee-Chelan.....	98-120
Yakima.....	98-108
Walla Walla.....	97-114
Cowlitz-Lewis.....	98-107
White-Green-Cedar.....	80-91
North Puget Sound.....	90-95
Olympic Peninsula.....	95-97







LEGEND  
CURRENT CONDITIONS

- MUCH ABOVE AVERAGE > 130%
- ABOVE AVERAGE 110 - 130%
- NEAR AVERAGE 90 - 110%
- BELOW AVERAGE 70 - 90%
- MUCH BELOW AVERAGE < 70%
- NOT FORECASTED
- WATERSHED BOUNDARY

JANUARY 1, 1996

MOUNTAIN SNOWPACK  
WASHINGTON

U.S. DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE

NTS

# BASIN SUMMARY OF SNOW COURSE DATA

JANUARY 1996

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-90	SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-90	
PEND OREILLE RIVER							YAKIMA RIVER							
BENTON MEADOW	2370	12/31/95	4	.5	3.5	2.7	BLEWETT PASS#2PILLOW	4270	1/01/96	---	5.4S	12.7	8.3	
BENTON SPRING	4920	12/31/95	15	2.9	12.5	8.0	BUMPING LAKE	3450	12/27/95	14	3.8	--	6.0	
BUNCHGRASS MDWPILLOW	5000	1/01/96	---	4.7	17.8	10.9	BUMPING LAKE (NEW)	3400	12/27/95	16	5.2E	9.3	7.5	
LOOKOUT PILLOW	5140	1/01/96	---	7.7	14.3	13.5	BUMPING RIDGE PILLOW	4600	1/01/96	---	7.5S	18.0	9.6	
NELSON CAN.	3100	1/02/96	26	6.5	10.1	7.2	CORRAL PASS PILLOW	6000	1/01/96	---	11.9S	22.7	13.5	
KETTLE RIVER							FISH LAKE	3370	12/27/95	30	10.2	23.7	10.7	
BARNES CREEK CAN.	5300	12/28/95	43	13.0	10.9	8.7	FISH LAKE PILLOW	3370	1/01/96	---	17.5S	23.0	12.4	
BIG WHITE MTN CAN.	5510	12/31/95	47	11.7	12.2	7.2	GREEN LAKE PILLOW	6000	1/01/96	---	8.6S	13.5	9.0	
FARRON CAN.	4000	1/03/96	31	7.1	--	9.9	GROUSE CAMP PILLOW	5380	1/01/96	---	6.9S	14.0	8.9	
MONASHEE PASS CAN.	4500	12/28/95	29	7.7	--	6.2	DOMMERIE FLATS	2200	12/29/95	10	2.0E	8.0	3.9	
COLVILLE RIVER							LOST HORSE PILLOW	5000	1/01/96	---	6.0S	9.1	15.3	
OMAK LAKE, TWIN LAKES							MORSE LAKE PILLOW	5400	1/01/96	---	18.3S	40.2	19.1	
MOSES MTN PILLOW	4800	1/01/96	---	9.1S	8.5	6.5	OLALLIE MDWS PILLOW	3960	1/01/96	---	16.6S	29.2	20.3	
SPOKANE RIVER							SASSE RIDGE PILLOW	4200	1/01/96	---	10.0S	22.3	12.4	
FOURTH OF JULY SUM	3200	12/27/95	0	.0	6.4	3.4	STAMPEDE PASS PILLOW	3860	1/01/96	---	12.9S	34.4	16.7	
LOST LAKE (d)	6110	1/01/96	---	17.8E	28.7	23.6	TUNNEL AVENUE	2450	12/28/95	13	4.0E	16.4	8.1	
MOSQUITO RDG PILLOW	5200	1/01/96	---	9.4	19.4	15.7	WHITE PASS ES PILLOW	4500	1/01/96	---	5.9S	15.5	9.8	
SUNSET PILLOW	5540	1/01/96	---	7.2	14.3	15.8	LEWIS - COWLITZ RIVERS							
LOOKOUT PILLOW	5140	1/01/96	---	7.7	14.3	13.5	JUNE LAKE PILLOW	3200	1/01/96	---	2.9S	34.1	11.5	
NEWMAN LAKE							LONE PINE PILLOW	3800	1/01/96	---	6.4S	21.4	12.0	
QUARTZ PEAK PILLOW	4700	1/01/96	---	3.2	16.4	8.5	PARADISE PARK PILLOW	5500	1/01/96	---	22.1S	47.1	23.6	
OKANOGAN RIVER							PIGTAIL PEAK PILLOW	5900	1/01/96	---	19.7S	34.0	20.1	
BLACKWALL PEAK CAN.	6370	1/01/96	---	17.9	--	14.8	POTATO HILL PILLOW	4500	1/01/96	---	6.3S	15.9	10.5	
ENDERBY CAN.	6200	12/31/95	88	26.8	16.5	18.6	SHEEP CANYON PILLOW	4050	1/01/96	---	4.2S	22.3	15.2	
GREYBACK RES CAN.	5120	12/27/95	22	5.8	6.1	3.1	SPENCER MDW PILLOW	3400	1/01/96	---	6.6S	21.5	9.4	
HAMILTON HILL CAN.	4890	12/30/95	30	7.9	7.6	8.4	SPIRIT LAKE PILLOW	3100	1/01/96	---	.6S	3.1	1.8	
HARTS PASS PILLOW	6500	1/01/96	---	27.1S	27.6	17.9	SURPRISE LKS PILLOW	4250	1/01/96	---	9.0S	28.4	20.2	
ISINTOK LAKE CAN.	5500	12/27/95	16	3.7	3.7	3.5	WHITE PASS ES PILLOW	4500	1/01/96	---	5.9S	15.5	9.8	
MISSEZULA MTN CAN.	5090	12/29/95	22	5.4	7.6	--	WHITE RIVER							
MISSION CREEK CAN.	5800	1/01/96	---	9.8	--	8.9	CORRAL PASS PILLOW	6000	1/01/96	---	11.9S	22.7	13.5	
MONASHEE PASS CAN.	4500	12/28/95	29	7.7	--	6.2	MORSE LAKE PILLOW	5400	1/01/96	---	18.3S	40.2	19.1	
MT. KOBAU CAN.	5900	12/28/95	23	6.3	7.1	6.3	GREEN RIVER							
SALMON MDWS PILLOW	4500	1/01/96	---	4.6S	7.9	3.9	COUGAR MTN. PILLOW	3200	1/01/96	---	4.4S	13.8	8.3	
SILVER STAR MTN CAN.	6000	12/31/95	67	20.3	17.5	13.4	GRASS MOUNTAIN #2	2900	12/27/95	0	.0	6.1	4.8	
SUMMERLAND RES CAN.	4200	12/28/95	20	5.2	5.3	4.5	LESTER CREEK	3100	12/29/95	0	.0E	14.6	8.0	
WHITE ROCKS MTN CAN.	6000	12/29/95	37	10.7	15.0	11.6	LYNN LAKE	4000	12/29/95	5	1.8E	15.8	7.6	
METHOW RIVER							SAWMILL RIDGE	4700	12/29/95	24	6.8E	22.5	13.3	
HARTS PASS PILLOW	6500	1/01/96	---	27.1S	27.6	17.9	STAMPEDE PASS PILLOW	3860	1/01/96	---	12.9S	34.4	16.7	
SALMON MDWS PILLOW	4500	1/01/96	---	4.6S	7.9	3.9	TWIN CAMP	4100	12/29/95	21	6.3	16.7	10.0	
CHELAN LAKE BASIN							CEDAR RIVER							
LYMAN LAKE	5900	1/01/96	---	25.9E	38.9	23.5	MT. GARDNER PILLOW	2860	1/01/96	---	2.7S	11.9	5.8	
LYMAN LAKE PILLOW	5900	1/01/96	---	28.1S	42.1	25.4	TINKHAM CREEK PILLOW	3000	1/01/96	---	7.9S	19.0	7.6	
MINERS RIDGE PILLOW	6200	1/01/96	---	27.1S	33.4	25.6	MEADOWS PASS PILLOW	3240	1/01/96	---	5.0S	16.4	9.5	
PARK CK RIDGE PILLOW	4600	1/01/96	---	21.6S	23.2	18.4	SNOQUALMIE RIVER							
RAINY PASS PILLOW	4780	1/01/96	---	22.1S	32.2	15.4	OLALLIE MDWS PILLOW	3960	1/01/96	---	16.6S	29.2	20.3	
ENTIAI RIVER							SKYKOMISH RIVER							
POPE RIDGE PILLOW	3540	1/01/96	---	12.2S	14.9	9.1	STAMPEDE PASS PILLOW	3860	1/01/96	---	12.9S	34.4	16.7	
WENATCHEE RIVER							STEVENS PASS PILLOW	4070	1/01/96	---	13.0S	32.5	15.3	
BERNE-MILL CREEK (d)	3170	12/28/95	25	8.1	20.1	11.2	STEVENS PASS SAND SD	3700	12/28/95	26	7.9	23.6	14.6	
BLEWETT PASS#2PILLOW	4270	1/01/96	---	5.4S	12.7	8.3	SKAGIT RIVER							
CHIWAUKUM G.S.	2500	12/28/95	18	5.5	9.3	4.8	HARTS PASS PILLOW	6500	1/01/96	---	27.1S	27.6	17.9	
FISH LAKE PILLOW	3370	1/01/96	---	17.5S	23.0	12.4	KLESILKWA CAN.	3710	1/03/96	7	1.2	--	--	
LYMAN LAKE	5900	1/01/96	---	25.9E	38.9	23.5	LYMAN LAKE	5900	1/01/96	---	25.9E	38.9	23.5	
LYMAN LAKE PILLOW	5900	1/01/96	---	28.1S	42.1	25.4	LYMAN LAKE PILLOW	5900	1/01/96	---	28.1S	42.1	25.4	
MERRITT	2140	12/28/95	16	4.5	12.5	7.1	RAINY PASS PILLOW	4780	1/01/96	---	22.1S	32.2	15.4	
STEVENS PASS PILLOW	4070	1/01/96	---	13.0S	32.5	15.3	THUNDER BASIN PILLOW	4200	1/01/96	---	14.5S	20.0	15.3	
STEVENS PASS SAND SD	3700	12/28/95	26	7.9	23.6	14.6	BAKER RIVER							
TROUGH #2 PILLOW	5310	1/01/96	---	5.3S	8.9	4.9	DOCK BUTTE	AM	3800	1/05/96	28	9.8	48.0	25.7
UPPER WHEELER PILLOW	4400	1/01/96	---	4.9S	7.5	5.9	EASY PASS	AM	5200	1/05/96	42	15.0	65.0	27.1
TEMILT CREEK							JASPER PASS	AM	5400	1/05/96	40	13.0	64.0	37.9
UPPER WHEELER PILLOW	4400	1/01/96	---	4.9S	7.5	5.9	MARTEN LAKE	AM	3600	1/05/96	28	9.6	45.0	30.1
COLOCKUM CREEK							MT. BLUM	AM	5800	1/05/96	5	1.6	42.0	24.4
TROUGH #2 PILLOW	5310	1/01/96	---	5.3S	8.9	4.9	ROCKY CREEK	AM	2100	1/05/96	9	3.0	30.0	11.7
HTANUM CREEK							SCHREIBERS MDW	AM	3400	1/05/96	24	8.2	33.0	21.9
GREEN LAKE PILLOW	6000	1/01/96	---	8.6S	13.5	9.0	SF THUNDER CK	AM	2200	1/05/96	5	1.6	6.8	4.5
LOST HORSE PILLOW	5000	1/01/96	---	6.0S	9.1	15.3	WATSON LAKES	AM	4500	1/05/96	28	9.5	35.0	24.2
MILL CREEK							QUILCENE RIVER							
HIGH RIDGE PILLOW	4980	1/01/96	---	5.1S	16.7	9.7	MOUNT CRAG PILLOW	4050	1/01/96	---	7.1S	16.7	11.3	
TOUCHET #2 PILLOW	5530	1/01/96	---	5.2	20.0	12.9								

(d) Denotes discontinued site.



# FOR ADDITIONAL INFORMATION

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## **Wenatchee - Chelan River Basins**

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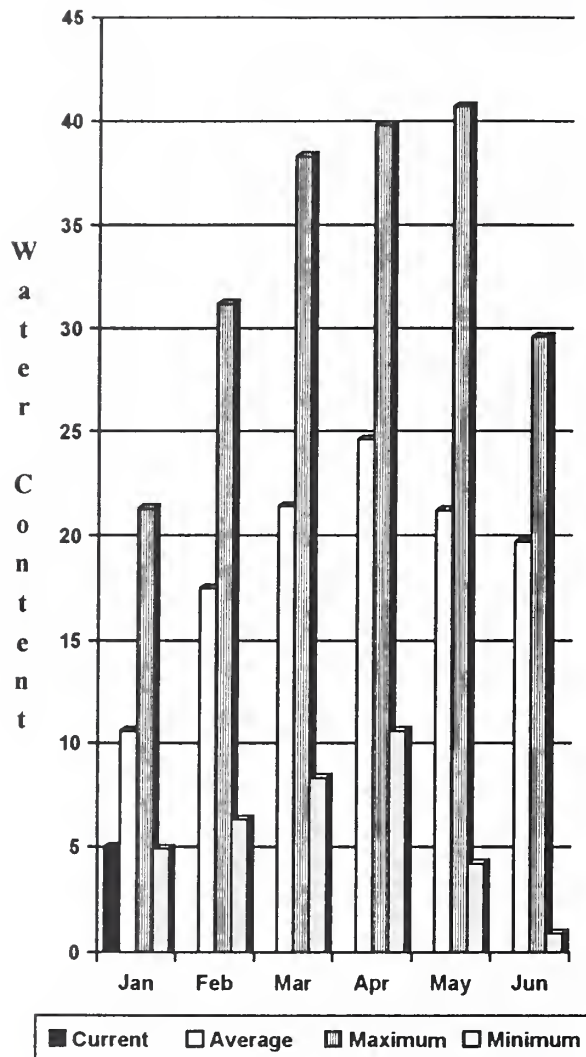
John Gillies, District Conservationist  
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Lynden Field Office  
(360) 354-2035

## **Olympic Peninsula River Basins**

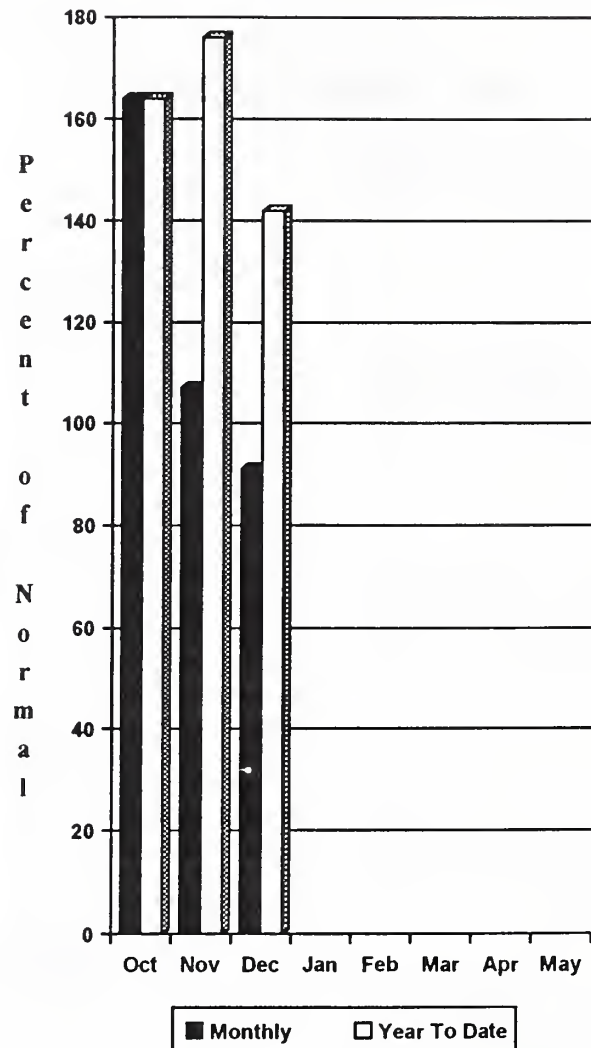
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# Spokane River Basin

Mountain Snowpack\* (inches)



Precipitation\* (% of normal)



\*Based on selected stations

The January 1 forecasts for summer runoff within the Spokane River Basin are 88% of normal, compared to 103% last year at this time. The forecast is based on a basin snowpack that is only 47% of average and precipitation that is 142% of normal for the water year. Precipitation for December was 91% of average. Streamflow on the Spokane River was 322% of average for December. January 1 storage in Coeur d'Alene Lake was 145,500 acre feet, 112% of normal, and 61% of capacity. Temperatures in the basin were 1.2 degrees above normal during December.

For more information contact your local Natural Resources Conservation Service office.



# SPOKANE RIVER BASIN

## Streamflow Forecasts - January 1, 1996

Forecast Point	Forecast Period	<<----- Drier ----- Future Conditions ----- Wetter ----->>						
		Chance Of Exceeding *					30-Yr Avg.	
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	(1000AF)
SPOKANE near Post Falls (2)	APR-SEP	1610	2090	2410	88	2730	3210	2730
	APR-JUL	1540	2010	2330	88	2650	3120	2633
SPOKANE at Long Lake	APR-JUL	1770	2260	2590	88	2920	3410	2936
	APR-SEP	1930	2440	2780	88	3120	3630	3159

SPOKANE RIVER BASIN Reservoir Storage (1000 AF) - End of December					SPOKANE RIVER BASIN Watershed Snowpack Analysis - January 1, 1996			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
COEUR D'ALENE	238.5	146.5	115.5	130.5	Spokane River	12	34	47

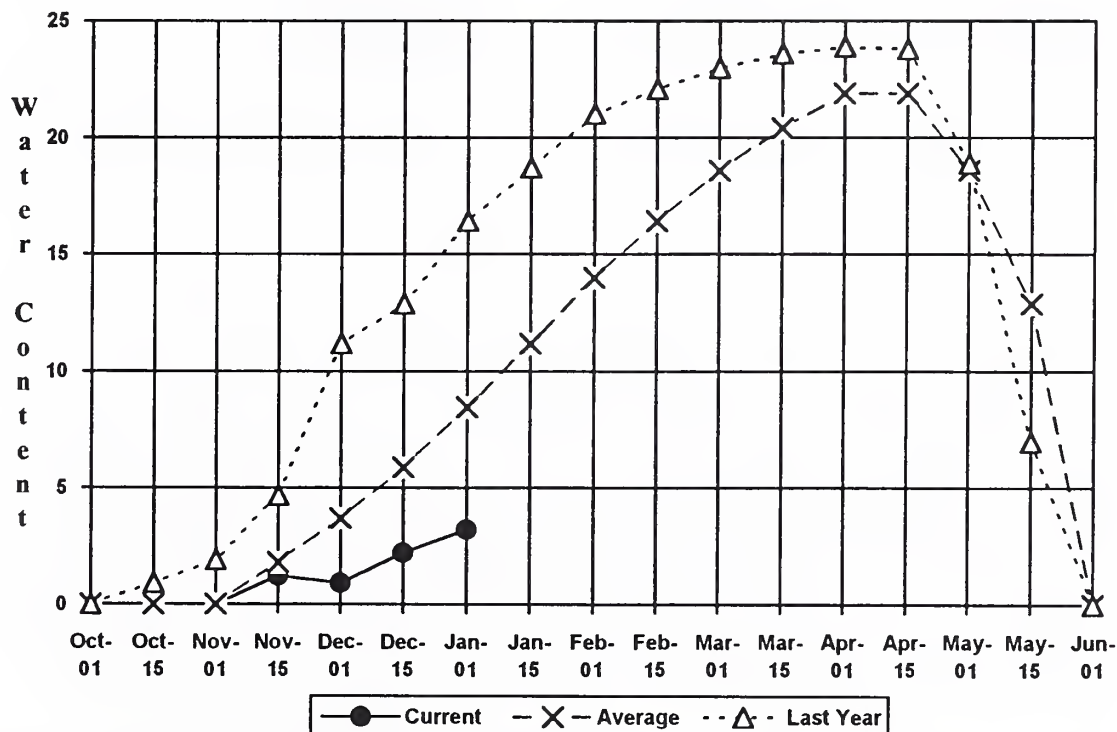
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

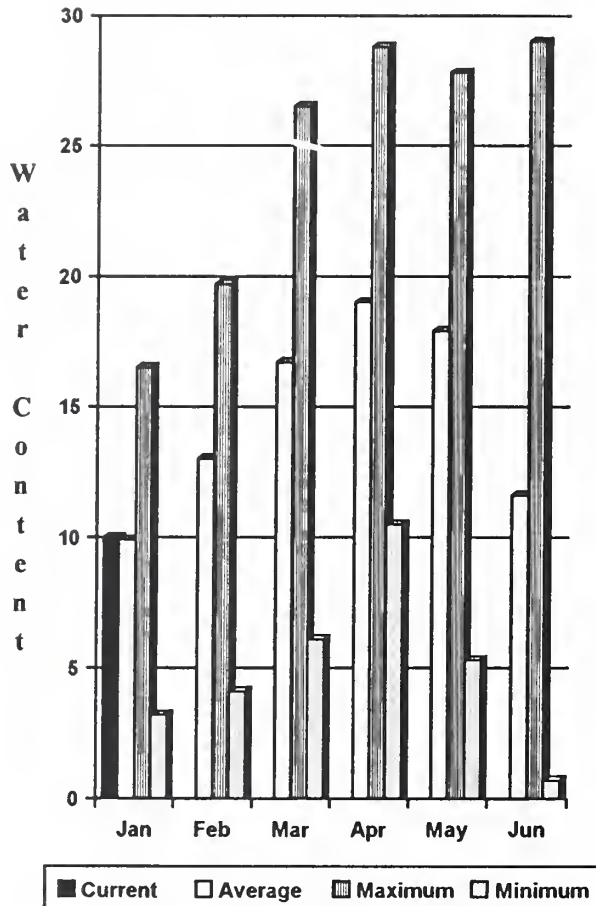
(2) - The value is natural flow - actual flow may be affected by upstream water management.

## Quartz Peak SNOTEL Elevation 4700 ft.

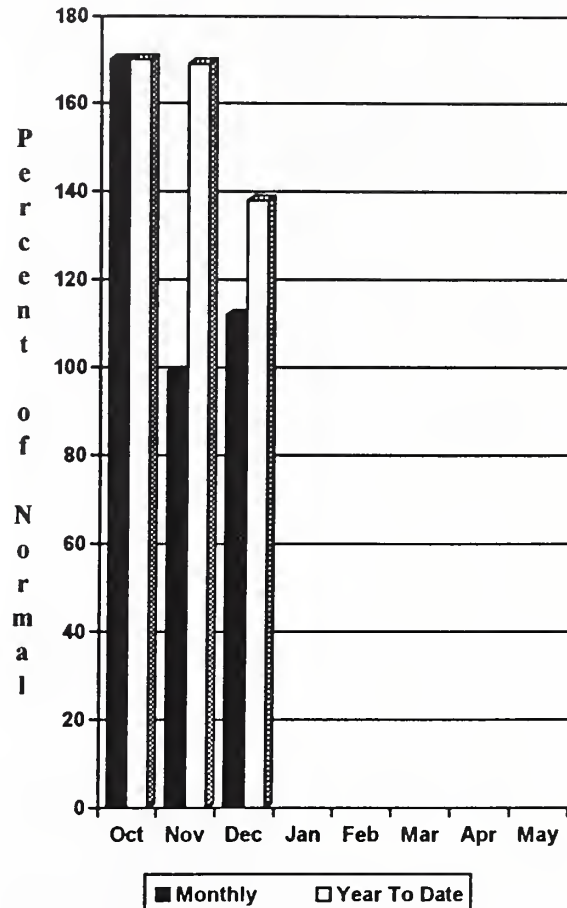


# Colville - Pend Oreille River Basins

Mountain Snowpack\* (inches)



Precipitation\* (% of normal)



\*Based on selected stations

The forecast for the Kettle River streamflow is for 120% of normal; the Pend Oreille, below Box Canyon, 112%; and the Priest River, near the town of Priest River, 108% of normal for the summer runoff period. Forecast for the Columbia River at Birchbank is for runoff to be 115% of average. December streamflow was 300% of normal on the Pend Oreille River, 211% on the Columbia at the International Boundary, and 349% on the Kettle River. January 1 snow cover was normal in the Pend Oreille Basin. Snowpack at Bunchgrass Meadow SNOTEL site contained 4.8 inches of water, compared to the average January 1 reading of 11.1 inches. Precipitation during December was 112% of average, bringing the water year-to-date to 138% of normal. Temperatures were 1.4 degrees above normal for December.

For more information contact your local Natural Resources Conservation Service office.



# COLVILLE - PEND OREILLE RIVER BASINS

## Streamflow Forecasts - January 1, 1996

Forecast Point	Forecast Period	<<===== Drier =====>>		Future Conditions		===== Wetter =====>>		30-Yr Avg. (1000AF)
		90%	70%	50% (Most Probable)	Chance Of Exceeding *	30%	10%	
		(1000AF)	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	
PEND OREILLE Lake Inflow (1,2)	APR-JUL	9320	13000	14700	112	16400	20100	13150
	APR-SEP	10100	14200	16000	111	17800	21900	14370
	APR-JUN	7560	11100	12640	111	14200	17700	11390
PRIEST nr Priest River (1,2)	APR-JUL	570	785	880	108	975	1190	814
	APR-SEP	610	835	940	108	1040	1270	868
PEND OREILLE bl Box Canyon (1,2)	APR-JUL	10300	13500	15000	112	16500	19700	13380
	APR-SEP	11300	14800	16400	112	18000	21500	14590
	APR-JUN	8990	11700	13000	112	14300	17000	11570
CHAMOKANE CK nr Long Lake	MAY-AUG	1.7	5.8	8.6	91	11.4	15.5	9.4
COLVILLE at Kettle Falls	APR-SEP	85	123	150	114	176	215	131
	APR-JUL	77	113	137	114	162	198	120
	APR-JUN	72	105	127	115	150	183	111
KETTLE near Laurier	APR-SEP	1820	2060	2220	120	2380	2620	1854
	APR-JUL	1730	1960	2110	120	2260	2490	1761
	APR-JUN	1590	1790	1930	122	2070	2270	1585
COLUMBIA at Birchbank (1,2)	APR-JUL	32200	37900	40500	115	43100	48800	35140
	APR-SEP	40100	47300	50500	115	53700	60900	43810
	APR-JUN	23500	27600	29500	115	31400	35500	25670
COLUMBIA at Grand Coulee Dm (1,2)	APR-SEP	56200	68700	74400	115	80100	92600	64850
	APR-JUL	47400	57800	62600	115	67400	77800	54543
	APR-JUN	37300	45500	49170	115	52900	61000	42756

### COLVILLE - PEND OREILLE RIVER BASINS Reservoir Storage (1000 AF) - End of December

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
ROOSEVELT	5232.0	4695.4	4837.7	4547.9	Colville River	0	0	0
BANKS	715.0	688.2	135.5	618.3	Pend Oreille River	59	92	103
					Kettle River	2	107	155

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

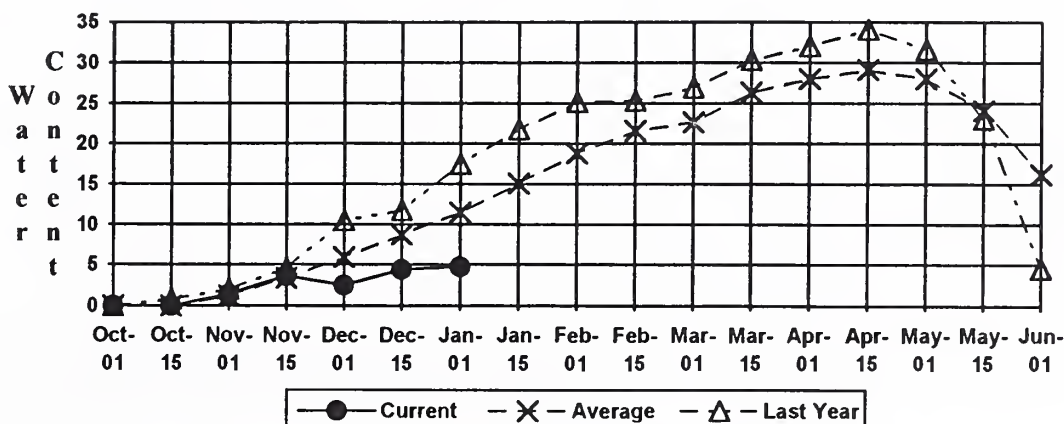
The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

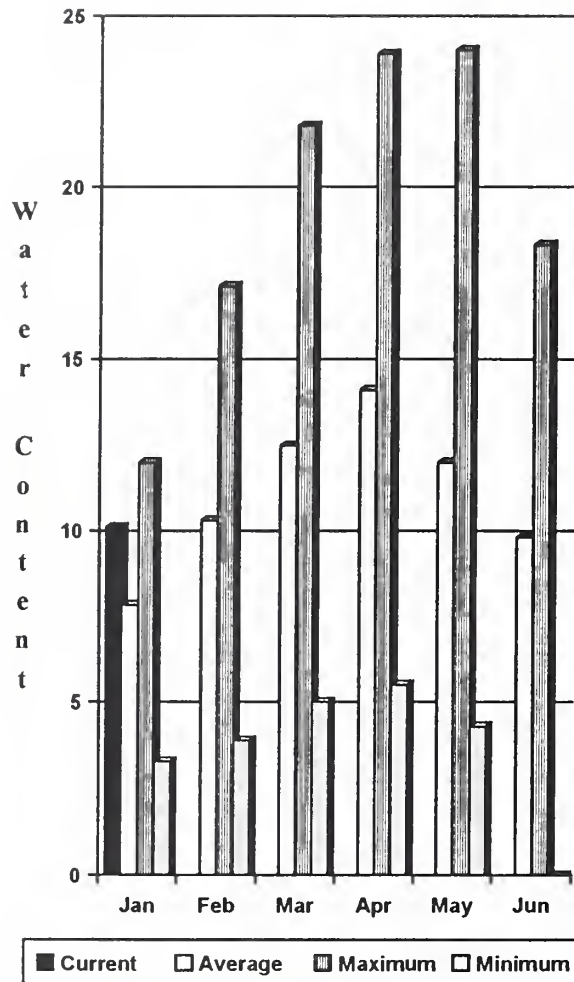
## Bunchgrass Meadow SNOTEL

Elevation 5000 ft.

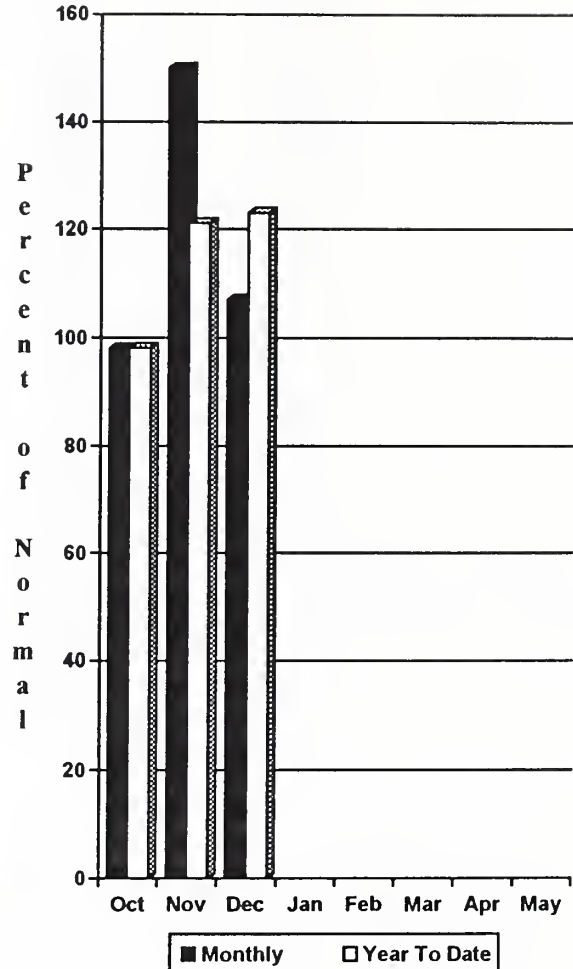


# Okanogan - Methow River Basins

Mountain Snowpack\* (inches)



Precipitation\* (% of normal)



\*Based on selected stations

Summer runoff forecast for the Okanogan River is 120% of normal; the Similkameen River, 120%, the Methow River, 125%, and Salmon Creek, 88% of normal. January 1 snow cover on the Okanogan was 130% of normal, and the Methow, 145%. December precipitation in the Okanogan-Methow was 107% of normal, with water year-to-date at 123% of average. December streamflow on the Methow River was 312% of normal, 383% on the Okanogan River, and 483% on the Similkameen. Snow-water-content at the Harts Pass SNOTEL, elevation 6,500 feet, was 27.5 inches. Normal for this site is 18.2 inches. Temperatures were 2.6 degrees above normal for December. Storage in the Conconully Reservoir was 8,900 acre feet, which is 68% of capacity and 151% of the January 1 average.

For more information contact your local Natural Resources Conservation Service office.



# **OKANOGAN - METHOW RIVER BASINS** Streamflow Forecasts - January 1, 1996

		<<----- Drier ----- Future Conditions ----- Wetter ----->>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
SIMILKAMEEN nr Nighthawk (1)	APR-SEP	910	1500	1680	120	1860	2460	1399
	APR-JUL	1060	1420	1580	121	1740	2100	1304
	APR-JUN	960	1230	1350	121	1470	1740	1113
OKANOGAN RIVER nr Tonasket (1)	APR-SEP	990	1720	1950	120	2180	2910	1624
	APR-JUL	1140	1590	1790	122	1990	2440	1467
	APR-JUN	1000	1350	1500	122	1650	2000	1234
SALMON CREEK near Conconully	APR-JUL	1.6	10.7	16.8	88	23	32	19.1
	APR-SEP	1.8	11.2	17.5	88	24	33	20
METHOW RIVER near Pateros	APR-SEP	670	1060	1180	125	1310	1690	942
	APR-JUL	820	985	1100	126	1210	1380	873
	APR-JUN	700	840	940	126	1040	1180	746

OKANOGAN - METHOW RIVER BASINS Reservoir Storage (1000 AF) - End of December					OKANOGAN - METHOW RIVER BASINS Watershed Snowpack Analysis - January 1, 1996			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average	
		This Year	Last Year	Avg			Last Yr	Average
SALMON LAKE	10.5	8.3	7.4	7.5	Okanogan River	10	104	130
CONCONULLY RESERVOIR	13.0	8.9	5.7	5.9	Methow River	2	89	145

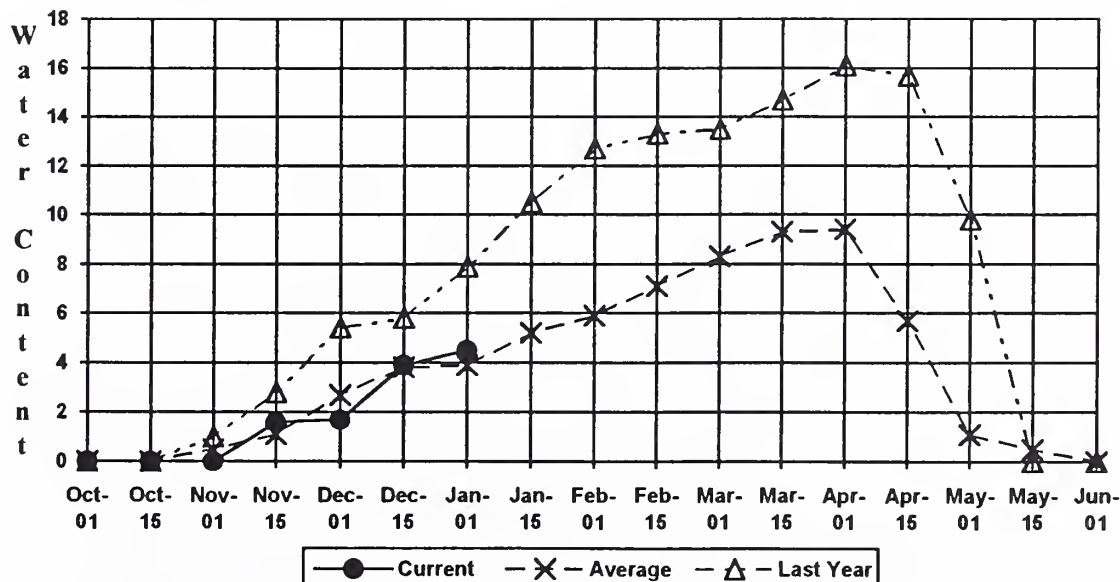
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

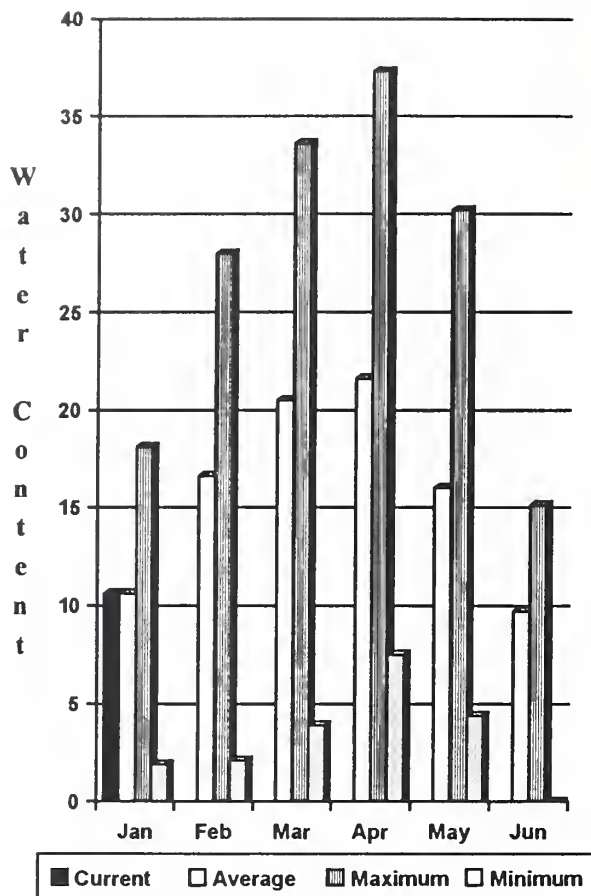
(2) - The value is natural flow - actual flow may be affected by upstream water management.

## **Salmon Meadows SNOTEL** Elevation 4500 ft.

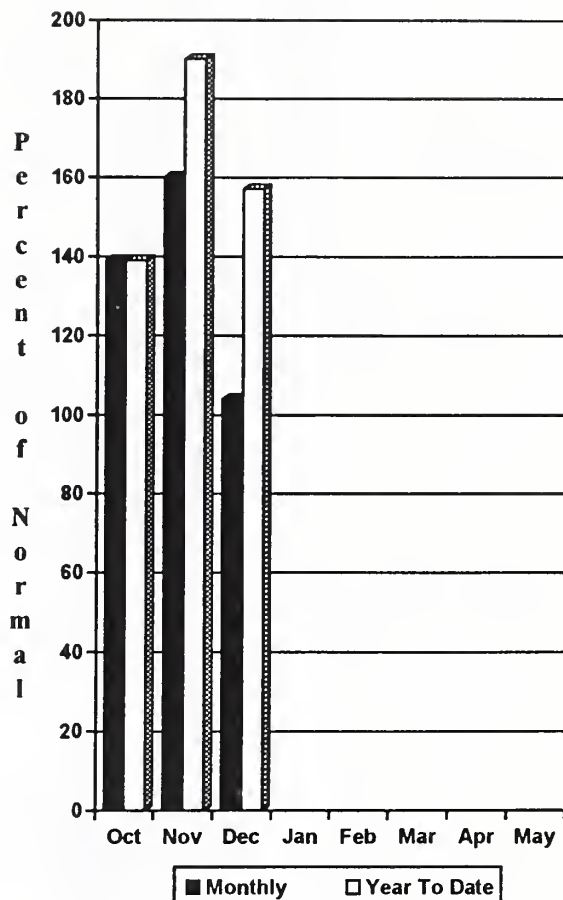


# Wenatchee - Chelan River Basins

Mountain Snowpack\* (inches)



Precipitation\* (% of normal)



\*Based on selected stations

Precipitation during December was 104% of normal in the basin and 157% for the year to date. Runoff for the Entiat River is forecast to be 119% of normal for the summer. The April-September forecast for the Chelan River is for 120%, for the Wenatchee River it is 109%, and 119% on the Stehekin. Icicle Creek is forecast to be 101% of normal this summer. Streamflow for December on the Chelan River was 299% of average and on the Wenatchee River it was 310% of normal. January 1 snowpack in the Wenatchee Basin was 92% of average, which is only 51% of last year. The Chelan Basin was 117% of average along with Trough SNOTEL on Colockum Ridge at 108% and Stemilt Creek at 83% of normal. Snowpack in the Entiat River Basin was at 134% of average. Reservoir storage in Lake Chelan was 629,500 acre feet or 166% of January 1 average and 93% of capacity. Lyman Lake SNOTEL had the most snow water with 28.1 inches of water. This site would normally have 25.4 inches and last year it had 42.1 inches.

For more information contact your local Natural Resources Conservation Service office.



# WENATCHEE - CHELAN RIVER BASINS

## Streamflow Forecasts - January 1, 1996

		<<----- Drier ----- Future Conditions ----- Wetter ----->>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
CHELAN RIVER near Chelan	APR-SEP	1240	1330	1390	120	1450	1540	1160
	APR-JUL	1110	1180	1230	120	1280	1350	1024
	APR-JUN	895	945	975	120	1010	1050	812
STEHEKIN near STEHEKIN	APR-SEP	870	935	980	119	1030	1090	827
	APR-JUL	760	805	834	119	865	905	701
	APR-JUN	610	625	640	119	655	670	538
ENTIAT RIVER near Ardenvoir	APR-SEP	198	240	270	119	300	340	227
	APR-JUL	178	220	245	118	270	310	206
	APR-JUN	144	175	196	116	215	245	169
WENATCHEE at Plain	APR-SEP	1010	1180	1300	109	1420	1590	1190
	APR-JUL	945	1080	1180	110	1280	1420	1072
	APR-JUN	780	880	950	110	1020	1120	864
WENATCHEE R. at Peshastin	APR-SEP	1230	1590	1830	112	2070	2430	1636
	APR-JUL	1120	1440	1660	112	1880	2200	1485
	APR-JUN	915	1170	1350	112	1530	1780	1204
STEMILT nr Wenatchee (miners in)	MAY-SEP	86	115	135	98	155	184	138
ICICLE CREEK nr Leavenworth	APR-SEP	245	320	375	101	430	505	370
	APR-JUL	230	300	350	103	400	470	340
	APR-JUN	184	240	280	104	320	375	270
COLUMBIA R. bl Rock Island Dam (2)	APR-SEP	61300	73900	82000	116	90100	102000	70485
	APR-JUL	52500	62600	69500	116	76400	86500	59736
	APR-JUN	41200	49100	54500	116	59900	67800	47007

WENATCHEE - CHELAN RIVER BASINS Reservoir Storage (1000 AF) - End of December					WENATCHEE - CHELAN RIVER BASINS Watershed Snowpack Analysis - January 1, 1996			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
CHELAN LAKE	676.1	629.5	343.7	378.7	Chelan Lake Basin	4	76	117
					Entiat River	1	82	134
					Wenatchee River	11	51	92
					Squilchuck Creek	0	0	0
					Stemilt Creek	1	65	83
					Colockum Creek	1	60	108

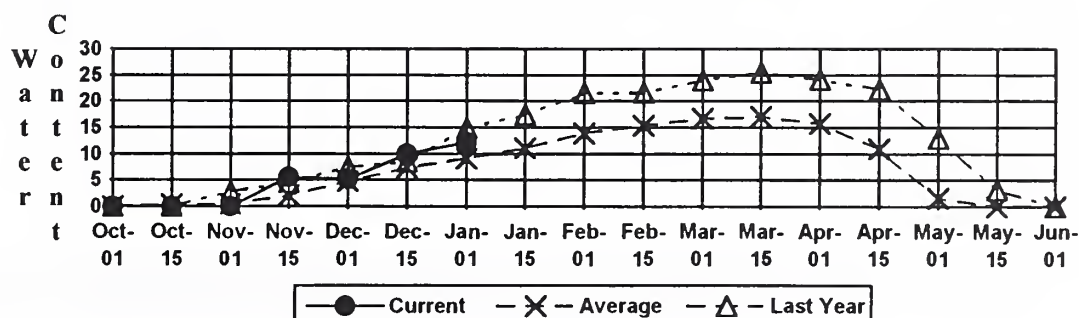
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

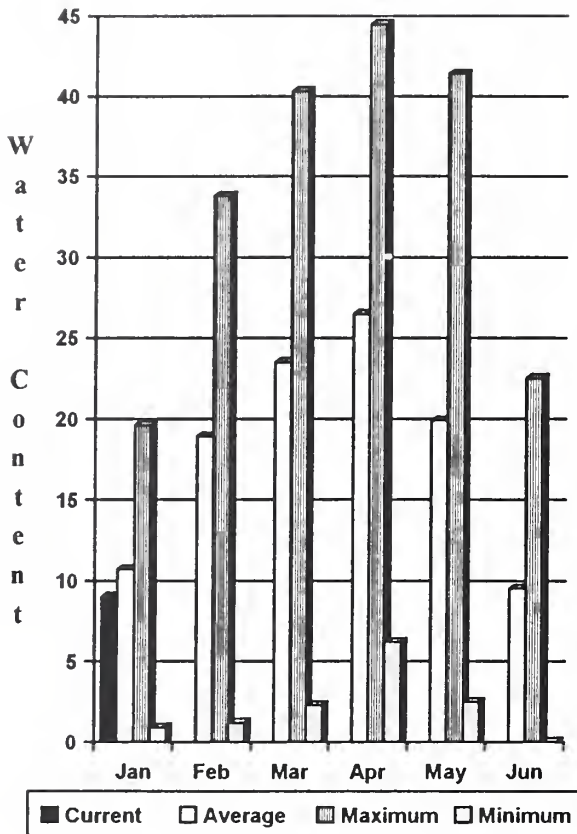
(2) - The value is natural flow - actual flow may be affected by upstream water management.

## Pope Ridge SNOTEL Elevation 3540 ft.

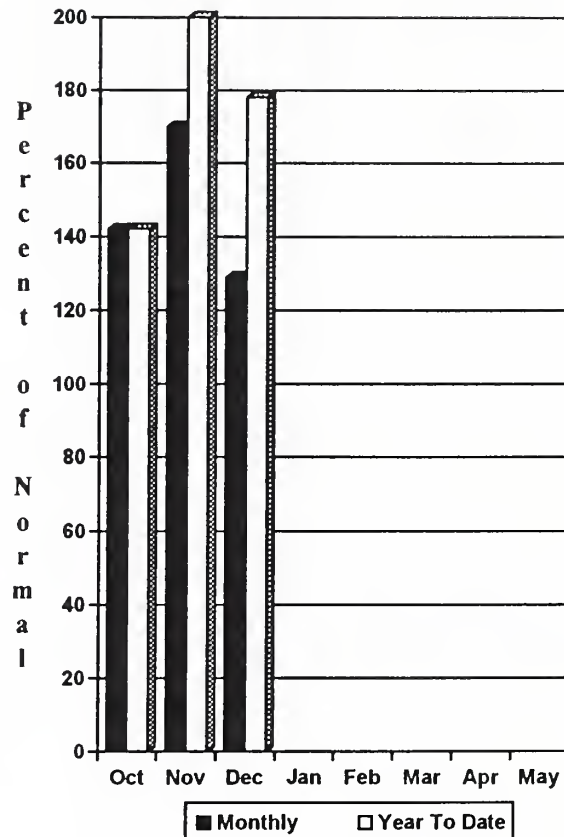


# Yakima River Basin

Mountain Snowpack\* (inches)



Precipitation\* (% of normal)



\*Based on selected stations

January 1 reservoir storage for the five major reservoirs was 777,200 acre feet, 134% of average. January 1 summer streamflow forecasts are for near to above normal in the Yakima Basin. Forecasts for the Yakima River at Cle Elum are for 105% of normal; Naches River, 100%; the Yakima River at Parker, 107%; Ahtanum Creek, 104%; and the Tieton River, 103%. The Klickitat River near Glenwood is forecast at 104% of normal flows this summer. December streamflows within the basin were; the Yakima River at Parker 208% of normal; the Yakima near Cle Elum, 150%; and the Naches River at 268%. January 1 snowpack was 84% based upon 15 snow courses and SNOTEL readings within the Yakima Basin. Precipitation was 129% of normal for December and 178% for the water year-to-date. Temperatures were 1.3 degrees above average for December. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

# YAKIMA RIVER BASIN

## Streamflow Forecasts - January 1, 1996

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>>						30-Yr Avg. (1000AF)
		Chance Of Exceeding *						
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
KEECHELUS LAKE INFLOW	APR-JUL	96	118	133	107	148	170	124
	APR-SEP	104	128	144	107	160	184	135
	APR-JUN	88	105	117	107	129	147	109
KACHESS LAKE INFLOW	APR-JUL	82	103	118	106	132	153	111
	APR-SEP	87	110	125	106	141	163	118
	APR-JUN	77	94	105	106	116	133	99
CLE ELUM LAKE INFLOW	APR-JUL	340	400	442	108	485	545	409
	APR-SEP	370	440	485	108	530	600	448
	APR-JUN	295	340	373	108	405	450	345
YAKIMA at Cle Elum	APR-JUN	580	690	762	106	835	945	721
	APR-JUL	655	790	882	106	975	1110	832
	APR-SEP	720	865	963	105	1060	1210	915
BUMPING LAKE INFLOW	APR-SEP	101	125	141	104	157	181	136
	APR-JUL	94	115	129	104	143	164	124
	APR-JUN	81	97	108	104	119	136	104
AMERICAN RIVER near Nile	APR-SEP	85	103	116	98	129	147	118
	APR-JUL	78	95	107	98	119	136	109
	APR-JUN	66	80	90	98	100	114	92
RIMROCK LAKE INFLOW	APR-SEP	190	225	245	103	265	300	238
	APR-JUL	163	191	209	104	230	255	200
	APR-JUN	134	155	169	104	183	205	162
NACHES near Naches	APR-SEP	620	745	832	100	915	1040	832
	APR-JUL	560	675	755	100	835	950	755
	APR-JUN	485	585	651	100	720	815	651
AHTANUM CREEK nr Tampico (2)	APR-SEP	27	40	48	104	57	69	46
	APR-JUL	25	36	44	104	52	63	42
	APR-JUN	21	31	37	104	44	54	36
YAKIMA near Parker	APR-SEP	1640	1930	2130	107	2330	2620	1994
	APR-JUL	1470	1740	1930	107	2120	2390	1805
	APR-JUN	1310	1550	1710	107	1870	2110	1597
KLICKITAT near Glenwood	APR-JUN	79	101	115	105	129	151	110
	APR-SEP	100	127	145	104	163	190	140

YAKIMA RIVER BASIN Reservoir Storage (1000 AF) - End of December					YAKIMA RIVER BASIN Watershed Snowpack Analysis - January 1, 1996			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
KEECHELUS	157.8	118.8	60.1	83.0	Yakima River	15	47	84
KACHESS	239.0	186.9	62.0	159.1	Ahtanum Creek	1	64	96
CLE ELUM	436.9	314.5	85.8	230.2				
BUMPING LAKE	33.7	15.2	16.7	6.3				
RIMROCK	198.0	141.8	60.4	102.1				

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

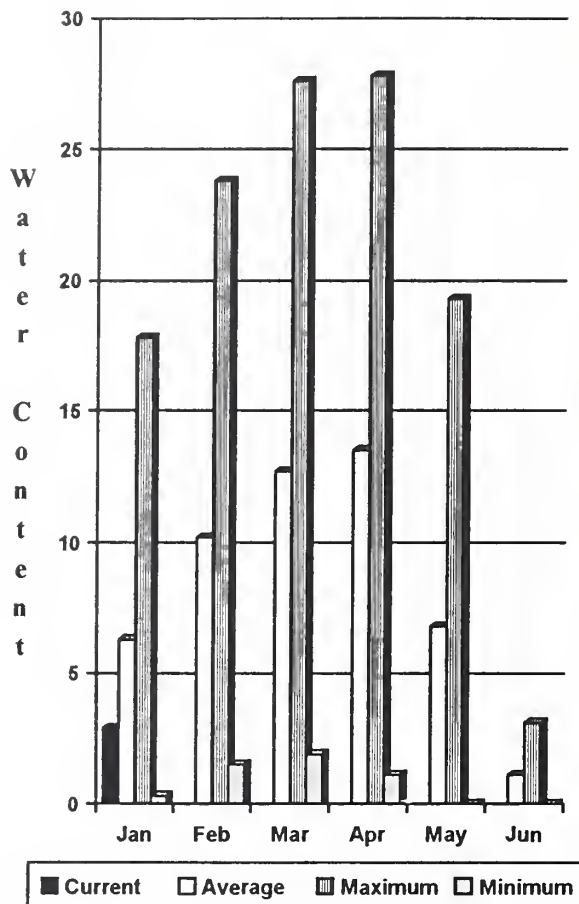
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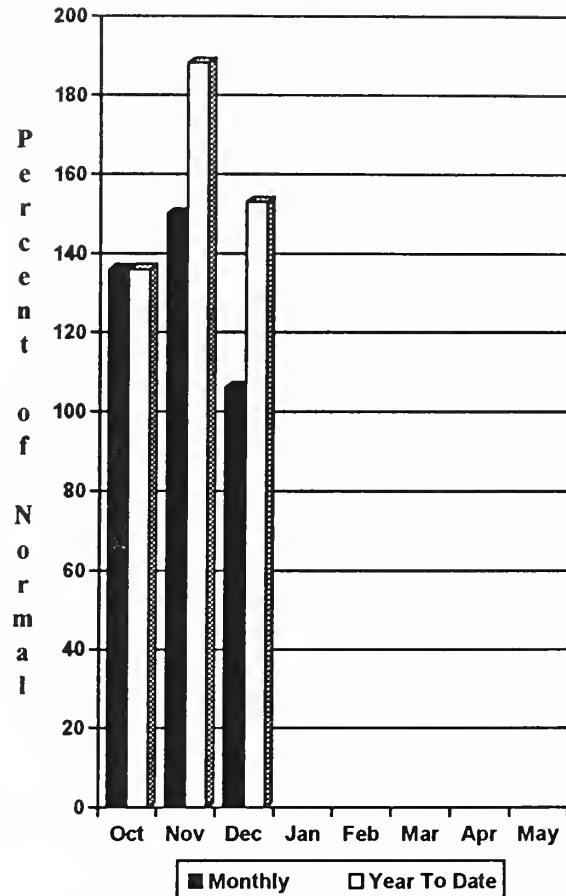
(2) - The value is natural flow - actual flow may be affected by upstream water management.



Mountain Snowpack\* (inches)



Precipitation\* (% of normal)



\*Based on selected stations

December precipitation was 106% of average, bringing the year-to-date precipitation to 153% of normal. January 1 snowpack was at 46% of normal. The forecast is for 102% of average streamflow in the Walla Walla River for the coming summer, for the Grande Ronde at Troy, 114%, and 97% for Mill Creek. December streamflow was 258% of normal for the Walla Walla River, 218% for the Snake River, and 259% for the Grande Ronde River near Troy. The Touchet SNOTEL site had 5.2 inches of snow-water-equivalent. The normal January 1 reading for this site is 12.9 inches. Temperatures were near average for December.

For more information contact your local Natural Resources Conservation Service office.

# **WALLA WALLA RIVER BASIN** Streamflow Forecasts - January 1, 1996

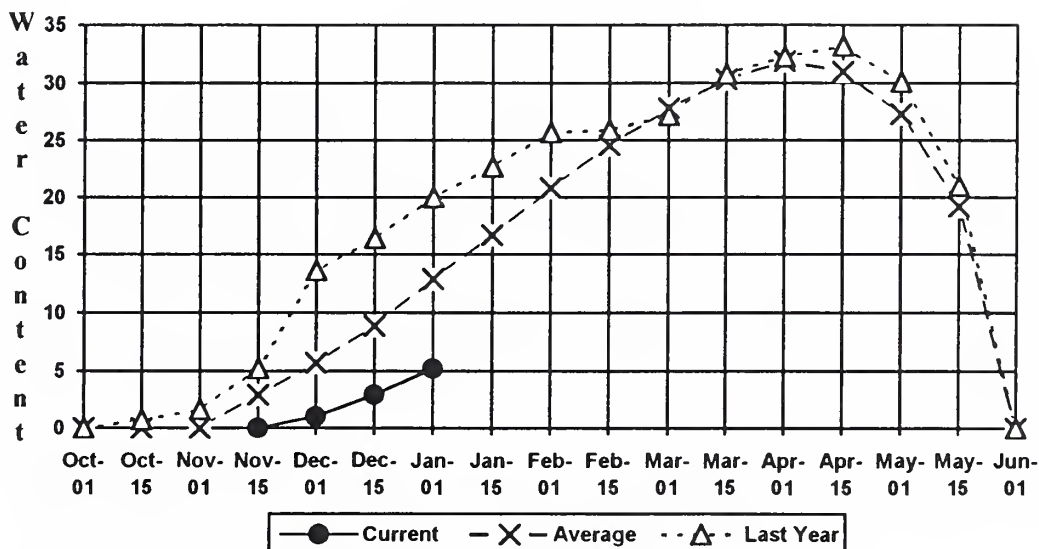
		<<===== Drier ===== Future Conditions ===== Wetter =====>>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	{% AVG.}	30% (1000AF)	10% (1000AF)	
GRANDE RONDE at Troy (1)	MAR-JUL	935	1450	1680	114	1910	2420	1471
	APR-SEP	825	1290	1500	114	1710	2170	1312
SNAKE b/w Lower Granite Dam (1,2)	APR-JUL	10800	18300	21700	100	25100	32500	21650
	APR-SEP	12200	20600	24400	100	28200	36600	24360
MILL CREEK at Walla Walla	APR-SEP	6.8	12.6	16.6	97	21	26	17.1
	APR-JUL	6.7	12.5	16.5	98	21	26	16.9
	APR-JUN	6.7	12.5	16.4	98	20	26	16.7
SF WALLA WALLA nr Milton Freewater	APR-JUL	43	49	54	102	59	65	53
COLUMBIA R. at The Dalles (2)	APR-SEP	78200	96100	108000	109	120000	138000	98982
	APR-JUL	67700	82700	92800	109	103000	118000	84760
	APR-JUN	54800	66900	75100	109	83300	95400	68925

WALLA WALLA RIVER BASIN Reservoir Storage (1000 AF) - End of December				WALLA WALLA RIVER BASIN Watershed Snowpack Analysis - January 1, 1996			
Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Watershed	Number of Data Sites	This Year as % of Last Yr Average	
			Avg				
				Mill Creek	2	28	46

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.  
The average is computed for the 1961-1990 base period.

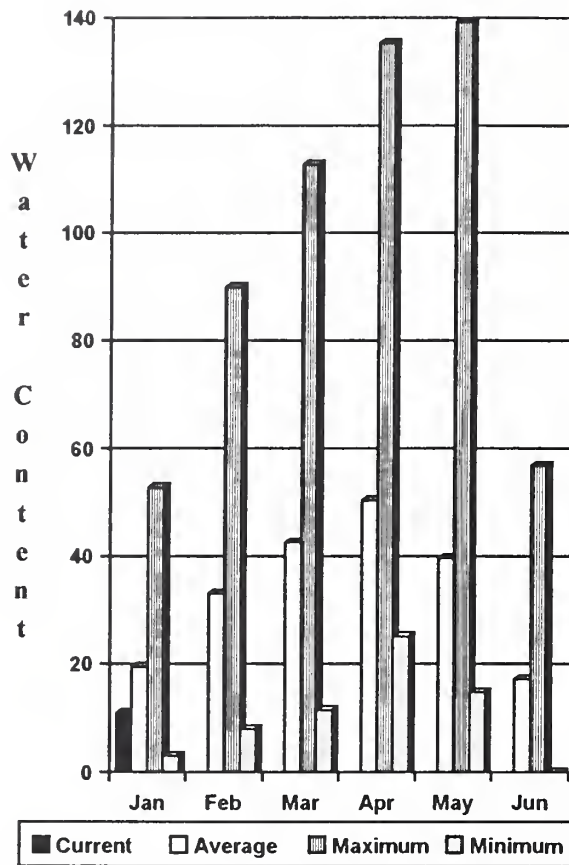
- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.  
(2) - The value is natural flow - actual flow may be affected by upstream water management.

## Touchet #2 SNOTEL Elevation 5530 ft.

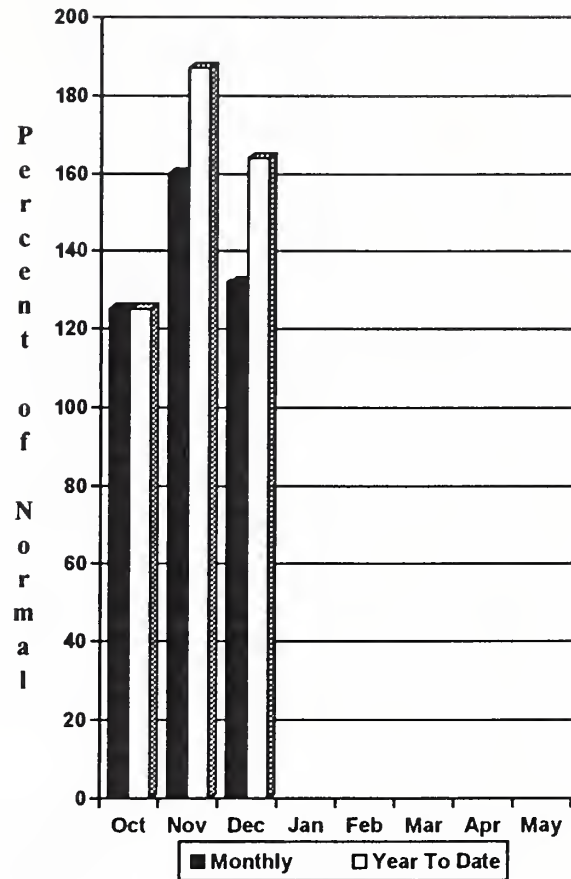


# Cowlitz - Lewis River Basins

Mountain Snowpack\* (inches)



Precipitation\* (% of normal)



\*Based on selected stations

The forecast for summer runoff in the Lewis River Basin is 98% of normal. The Cowlitz River is forecast for 106% of normal runoff. December streamflow for the Cowlitz River was 187% of average, and 145% for the Lewis River. December precipitation was 132% of normal, 164% of average for the water-year. January 1 snow cover for the Cowlitz River was 73% and the Lewis River was 47% of average. The Paradise Park SNOTEL recorded the most water content for the basin with 22.1 inches of water. Normal January 1 water content is 23.6 inches. Temperatures were 2 degrees above normal for December.

For more information contact your local Natural Resources Conservation Service office.



# COWLITZ - LEWIS RIVER BASINS

## Streamflow Forecasts - January 1, 1996

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>>						30-Yr Avg. (1000AF)
		Chance Of Exceeding *						
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
LEWIS RIVER at Ariel (2)	APR-SEP	660	970	1180	98	1390	1700	1204
	APR-JUL	580	845	1030	98	1210	1480	1051
	APR-JUN	515	755	915	98	1080	1310	933
COWLITZ R. bl Mayfield Dam (2)	APR-SEP	730	1730	2100	107	2470	3470	1970
	APR-JUL	1040	1520	1840	106	2160	2640	1731
	APR-JUN	885	1290	1565	106	1840	2250	1477
COWLITZ R. at Castle Rock (2)	APR-SEP	935	2560	2830	106	3100	4720	2667
	APR-JUL	1890	2230	2470	106	2710	3050	2325
	APR-JUN	1610	1910	2110	106	2310	2610	1995
Klickitat near Glenwood	APR-JUN	79	101	115	105	129	151	110
	APR-SEP	100	127	145	104	163	190	140

COWLITZ - LEWIS RIVER BASINS  
Reservoir Storage (1000 AF) - End of December

COWLITZ - LEWIS RIVER BASINS  
Watershed Snowpack Analysis - January 1, 1996

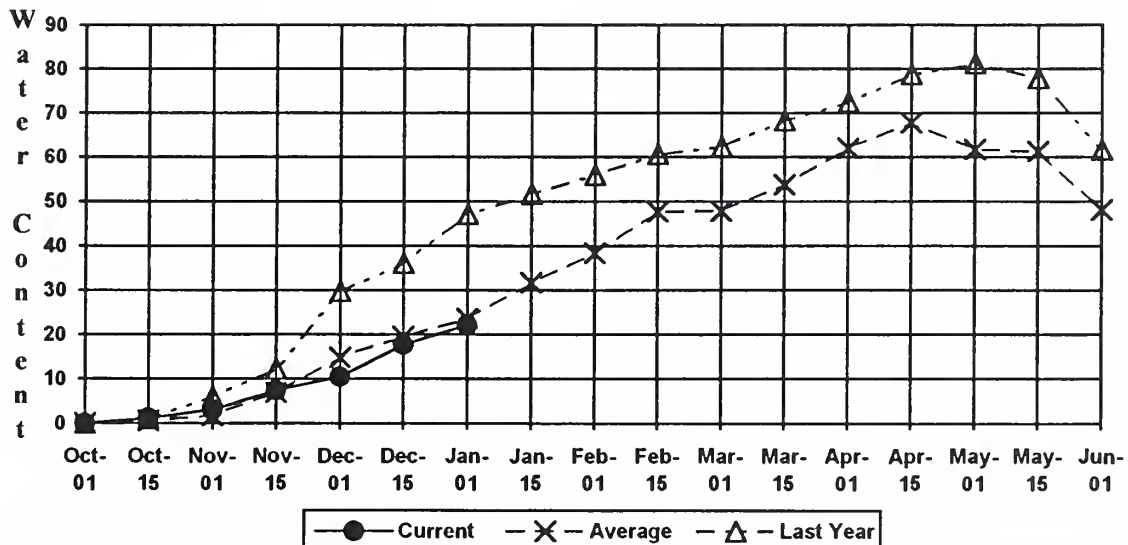
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					Cowlitz River	6	43	73
					Lewis River	4	24	47

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.  
 (2) - The value is natural flow - actual flow may be affected by upstream water management.

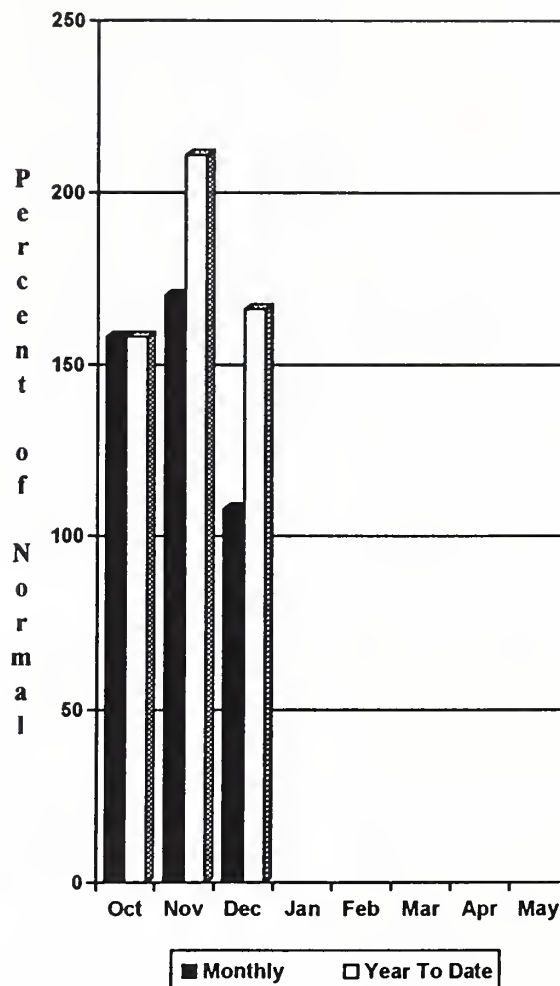
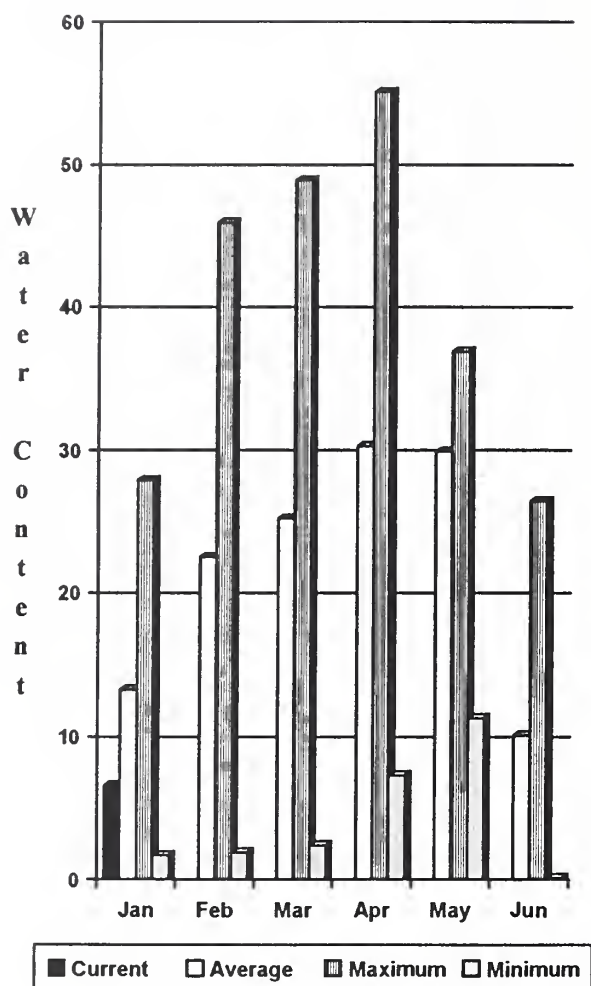
Paradise SNOTEL  
Elevation 5120 ft.



# White - Green - Cedar River Basins

Mountain Snowpack\* (inches)

Precipitation\* (% of normal)



\*Based on selected stations

Summer runoff is forecast to be 85% of normal for the Green River and 86% for the Cedar River near Cedar Falls, 84% for the Rex River, 91% for the South Fork of the Tolt River and 80% for the Cedar River at Cedar Falls. January 1 snowpack was 93% of normal in the White River Basin and 47% in the Green River Basin. Water content on January 1 at the Morse Lake SNOTEL, at an elevation of 5,400 feet, was 18.3 inches. This site has a January 1 average of 19.1 inches. December precipitation was 108% of normal, bringing the water year-to-date to 166% of average. The National Weather Service reported temperatures at Stampede Pass to be 1.8 degrees below normal for December.

For more information contact your local Natural Resources Conservation Service office.

# WHITE - GREEN - CEDAR RIVER BASINS

## Streamflow Forecasts - January 1, 1996

		<<----- Drier ----- Future Conditions ----- Wetter ----->>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
GREEN RIVER below Howard Hanson Dam	APR-JUL	150	192	220	86	250	290	257
	APR-SEP	159	210	242	85	275	325	285
	APR-JUN	124	169	200	85	230	275	234
CEDAR RIVER near Cedar Falls	APR-JUL	37	54	65	84	76	93	77
	APR-SEP	41	60	73	86	85	104	85
	APR-JUN	37	50	59	86	68	81	68
REX RIVER near Cedar Falls	APR-JUL	12.0	18.0	23	84	27	34	27
	APR-SEP	13.0	20	25	84	30	38	30
	APR-JUN	12.0	17.0	21	84	25	30	25
CEDAR RIVER at Cedar Falls	APR-JUL	21	48	66	80	84	110	82
	APR-SEP	19.0	47	66	80	86	114	83
	APR-JUN	27	49	64	80	79	101	80
SOUTH FORK TOLT near Index	APR-JUL	10.0	12.2	13.7	90	15.2	17.4	15.2
	APR-SEP	11.9	14.5	16.2	91	17.9	21	17.8
	APR-JUN	8.6	10.5	11.8	90	13.1	15.0	13.1

WHITE - GREEN RIVER BASINS Reservoir Storage (1000 AF) - End of December					WHITE - GREEN RIVER BASINS Watershed Snowpack Analysis - January 1, 1996			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					White River	2	48	93
					Green River	7	26	47
					Cedar River	0	0	0

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

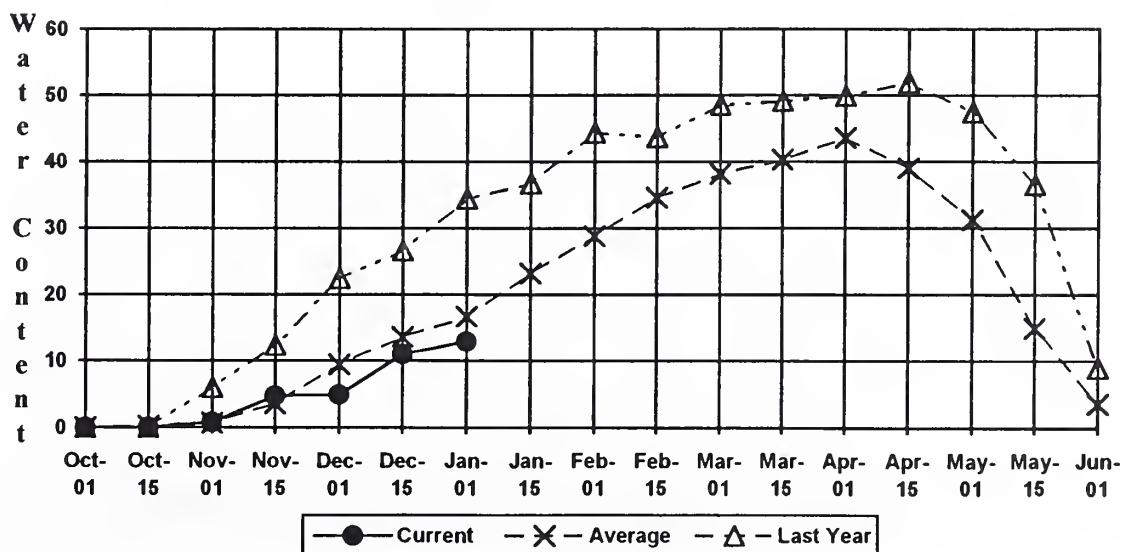
The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

## Stampede Pass SNOTEL

Elevation 3860 ft.

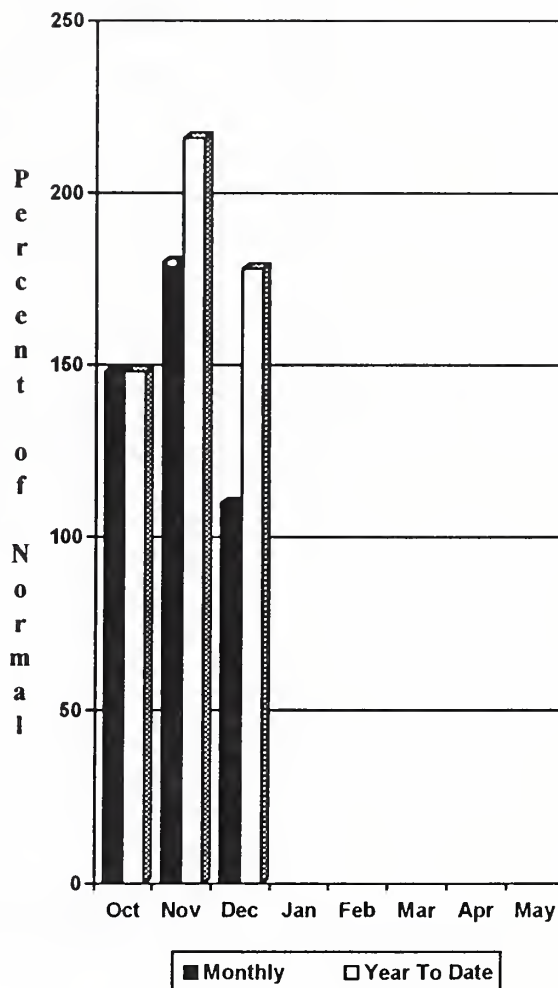
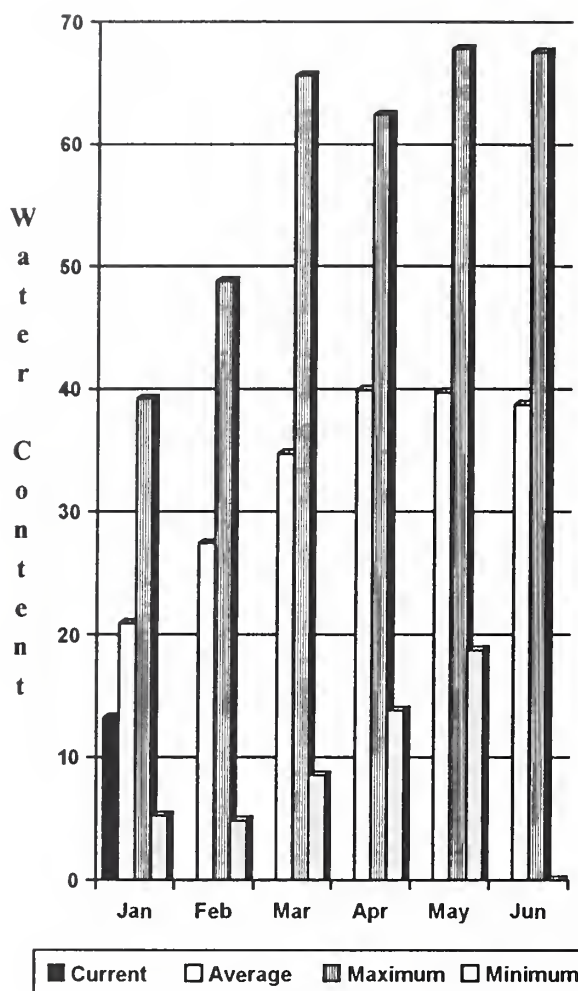




# North Puget Sound River Basins

Mountain Snowpack\* (inches)

Precipitation\* (% of normal)



\*Based on selected stations

Forecast for the Skagit River streamflow is for 95% of normal for the spring and summer period. December streamflow in the Skagit River was 168% of average. Other forecast points included the Baker River at 90% and Thunder Creek at 92%. Basin-wide precipitation for December was 110% of average, bringing water-year-to-date to 178% of normal. January 1 snow cover in the Skagit River Basin was 132%, the Baker River Basin was, 34% and the Snohomish River Basin was 75% of average. Rainy Pass SNOTEL, at 4,780 feet, had 22.1 inches of water content. Normal January 1 water content is 15.4 inches. January 1 reservoir storage showed Ross Lake at 161% normal and 90% of capacity. December temperatures were 2 degrees above normal.

For more information contact your local Natural Resources Conservation Service office.

# NORTH PUGET SOUND RIVER BASINS

## Streamflow Forecasts - January 1, 1996

		<<----- Drier ----- Future Conditions ----- Wetter ----->>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	% AVG.)	30% (1000AF)	10% (1000AF)	
THUNDER CREEK near Newhalem	APR-JUL	174	193	206	89	220	235	230
	APR-SEP	260	285	303	92	320	345	328
	APR-JUN	105	123	135	91	147	165	149
SKAGIT RIVER at Newhalem (2)	APR-SEP	1490	1830	2070	95	2310	2650	2185
	APR-JUL	1250	1540	1740	95	1940	2230	1830
	APR-JUN	970	1190	1340	95	1490	1710	1410
BAKER RIVER near Concrete	APR-JUL	585	685	750	90	820	915	836
	APR-SEP	775	885	960	90	1040	1150	1064
	APR-JUN	435	515	566	93	620	700	611

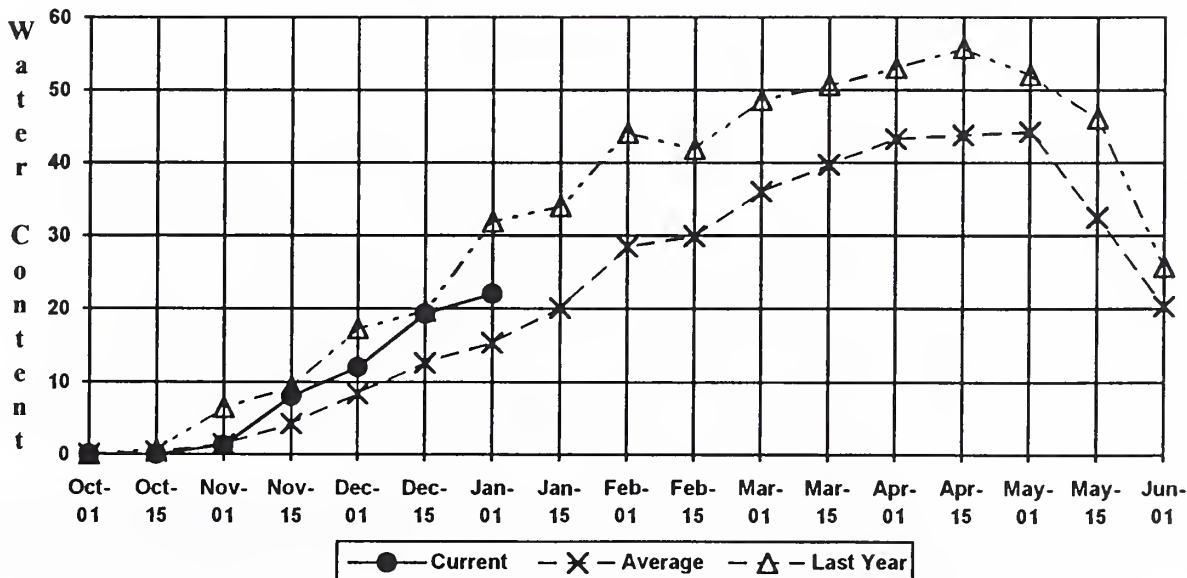
NORTH PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of December					NORTH PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - January 1, 1996			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
ROSS	1404.1	1260.8	1034.9	783.9	Snohomish River	4	42	75
DIABLO RESERVOIR		NO REPORT			Skagit River	3	76	132
GORGE RESERVOIR		NO REPORT			Baker River	9	19	34

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

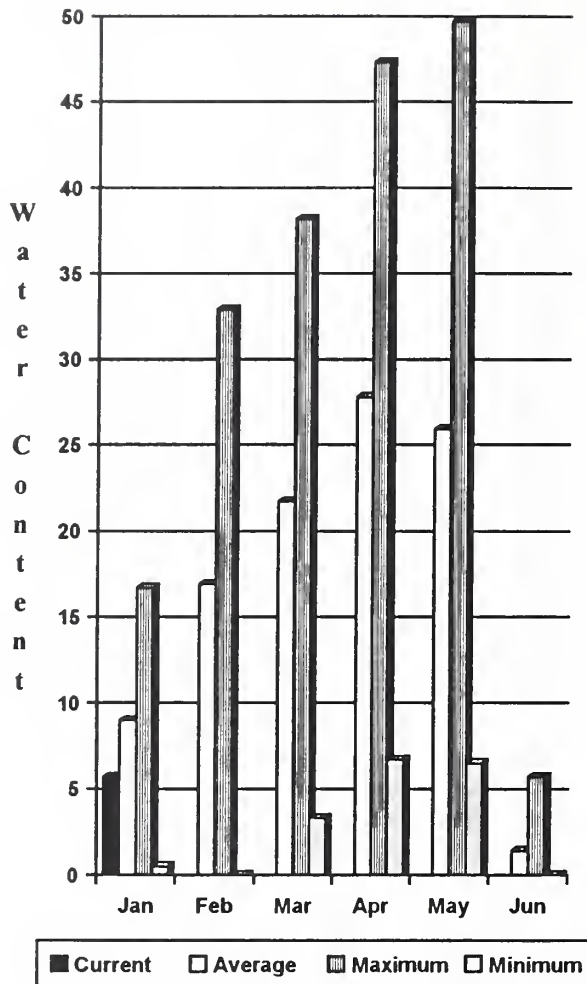
- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.  
 (2) - The value is natural flow - actual flow may be affected by upstream water management.

### Rainy Pass SNOTEL Elevation 4780 ft.

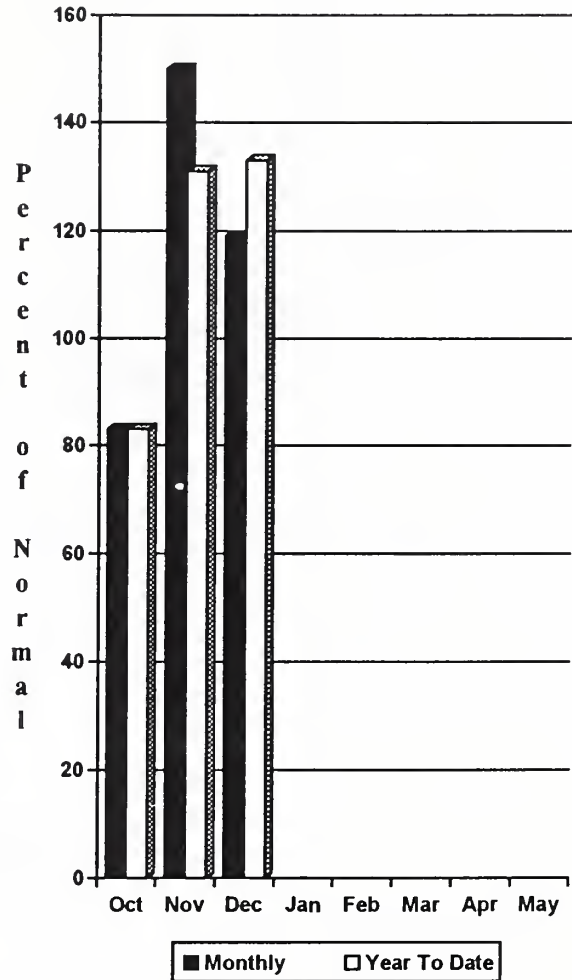


# Olympic Peninsula River Basins

Mountain Snowpack\* (inches)



Precipitation\* (% of normal)



\*Based on selected stations

January forecasts of runoff for streamflow in the basin are for near normal for both the Dungeness and Elwha Rivers. The Big Quilcene can expect near normal runoff this summer also. December precipitation was 119% of average. Precipitation has accumulated at 133% of normal for the water year. December precipitation at Quillayute was 13.9 inches, which is slightly below normal at 95% of average. Average January 1 snow cover in the Olympic Basin was much below average at 63%. The Mount Crag SNOTEL near Quilcene had 7.1 inches of snow-water-equivalent on January 1. Normal for this site is 11.3 inches. Temperatures at Quillayute were 2.7 degrees above normal for December.

For more information contact your local Natural Resources Conservation Service office.



# OLYMPIC PENINSULA RIVER BASINS

## Streamflow Forecasts - January 1, 1996

		Future Conditions						
Forecast Point	Forecast Period	<<----- Drier -----		Future Conditions		----- Wetter ----->>		30-Yr Avg. (1000AF)
		Chance Of Exceeding *		Chance Of Exceeding *		Chance Of Exceeding *		
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
DUNGENESS RIVER nr Sequim	APR-SEP	123	142	155	97	168	187	160
	APR-JUL	101	117	127	97	137	153	131
	APR-JUN	76	87	95	97	103	114	98
ELWHA RIVER nr Port Angeles	APR-SEP	365	435	477	95	520	585	502
	APR-JUL	310	365	400	96	435	490	417

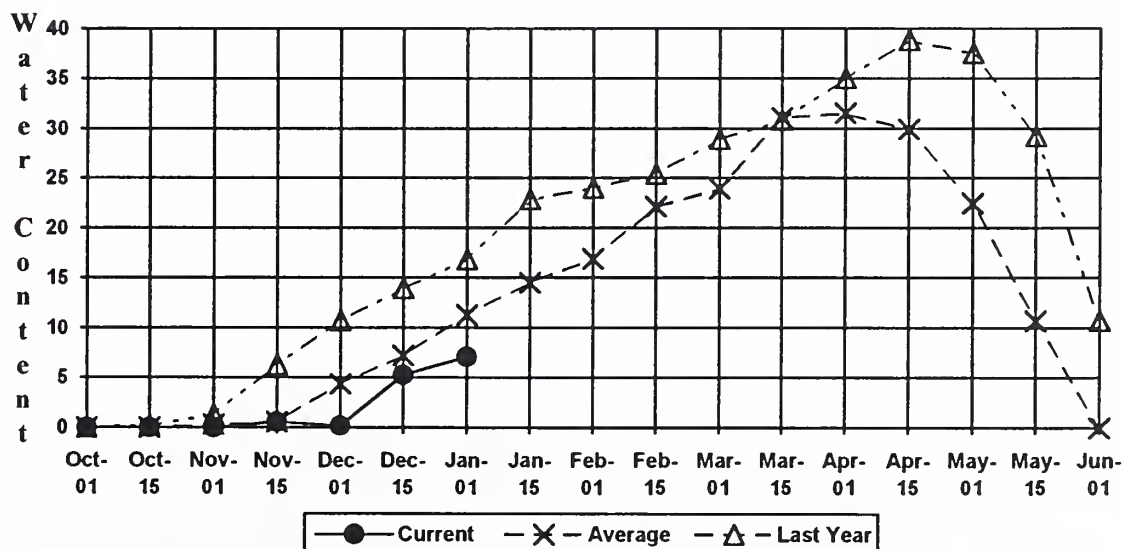
OLYMPIC PENINSULA RIVER BASINS Reservoir Storage (1000 AF) - End of December					OLYMPIC PENINSULA RIVER BASINS Watershed Snowpack Analysis - January 1, 1996			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					Elwha River	0	0	0
					Morse Creek	0	0	0
					Dungeness River	0	0	0
					Quilcene River	1	43	63
					Wynoochee River	0	0	0

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.  
(2) - The value is natural flow - actual flow may be affected by upstream water management.

## Mount Crag SNOTEL Elevation 4050 ft.



# Interpreting Streamflow Forecasts

## Introduction

Each month, five forecasts are issued for each forecast point and each forecast period. Unless otherwise specified, all streamflow forecasts are for streamflow volumes that would occur naturally without any upstream influences. Water users need to know what the different forecasts represent if they are to use the information correctly when making operational decisions. The following is an explanation of each of the forecasts.

**Most Probable (50 Percent Chance of Exceeding) Forecast.** This forecast is the best estimate of streamflow volume that can be produced given current conditions and based on the outcome of similar past situations. There is a 50 percent chance that the streamflow volume will exceed this forecast value. There is a 50 percent chance that the streamflow volume will be less than this forecast value.

The most probable forecast will rarely be exactly right, due to errors resulting from future weather conditions and the forecast equation itself. This does not mean that users should not use the most probable forecast; it means that they need to evaluate existing circumstances and determine the amount of risk they are willing to take by accepting this forecast value.

## To Decrease the Chance of Having Too Little Water

If users want to make sure there is enough water available for their operations, they might determine that a 50 percent chance of the streamflow volume being lower than the most probable forecast is too much risk to take. To reduce the risk of not having enough water available during the forecast period, users can base their operational decisions on one of the forecasts with a greater chance of being exceeded (or possibly some point in-between). These include:

**70 Percent Chance of Exceeding Forecast.** There is a 70 percent chance that the streamflow volume will exceed this forecast value. There is a 30 percent chance the streamflow volume will be less than this forecast value.

**90 Percent Chance of Exceeding Forecast.** There is a 90 percent chance that the streamflow volume will exceed this forecast value. There is a 10 percent chance the streamflow volume will be less than this forecast value.

## To Decrease the Chance of Having Too Much Water

If users want to make sure they don't have too much water, they might determine that a 50 percent chance of the streamflow being higher than the most probable forecast is too much of a risk to take. To reduce the risk of having too much water available during the forecast period, users can base their operational decisions on one of the forecasts with a smaller chance of being exceeded. These include:

**30 Percent Chance of Exceeding Forecast.** There is a 30 percent chance that the streamflow volume will exceed this forecast value. There is a 70 percent chance the streamflow volume will be less than this forecast value.

**10 Percent Chance of Exceeding Forecast.** There is a 10 percent chance that the streamflow volume will exceed this forecast value. There is a 90 percent chance the streamflow volume will be less than this forecast value.

## Using the forecasts—an example

**Using the Most Probable Forecast.** Using the example forecasts shown below, users can reasonably expect 36,000 acre-feet to flow past the gaging station on the Mary's River near Deeth between March 1 and July 31.

**Using the Higher Exceedance Forecasts.** If users anticipate a somewhat drier trend in the future (monthly and seasonal weather outlooks are available from the National Weather Service every two weeks), or if they are operating at a level where an unexpected shortage of water could cause problems, they might want to plan on receiving only 20,000 acre-feet (from the 70 percent chance of exceeding forecast). In seven out of ten years with similar conditions, streamflow volumes will exceed the 20,000 acre-foot forecast.

If users anticipate extremely dry conditions for the remainder of the season, or if they determine the risk of using the 70 percent chance of exceeding forecast is too great, then they might plan on receiving only 5000 acre-feet (from the 90 percent chance of exceeding forecast). Nine out of ten years with similar conditions, streamflow volumes will exceed the 5000 acre-foot forecast.

**Using the Lower Exceedance Forecasts.** If users expect wetter future conditions, or if the chance that five out of every ten years with similar conditions would produce streamflow volumes greater than 36,000 acre-feet was more than they would like to risk, they might plan on receiving 52,000 acre-feet (from the 30 percent chance of exceeding forecast) to minimize potential flooding problems. Three out of ten years with similar conditions, streamflows will exceed the 52,000 acre-foot forecast.

In years when users expect extremely wet conditions for the remainder of the season and the threat of severe flooding and downstream damage exists, they might choose to use the 76,000 acre-foot (10 percent chance of exceeding) forecast for their water management operations. Streamflow volumes will exceed this level only one year out of ten.

UPPER HUMBOLDT RIVER BASIN											
STREAMFLOW FORECASTS											
FORECAST POINT	FORECAST PERIOD	<---DRIER --- FUTURE CONDITIONS ---WETTER-->									
		----- ----- ----- ----- ----- -----									
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	30% (1000AF)	10% (1000AF)	25 YR. (1000AF)	Chance of Exceeding (% AVG.) (1000AF)	30% (1000AF)	10% (1000AF)	25 YR. (1000AF)
MARY'S RIVER nr Deeth	MAR-JUL	5.0	20.0	36	77	52	76	47			
	APR-JUL	8.0	17.0	31	74	45	67	42			
LAMOILLE CREEK nr Lamoille	MAR-JUL	6.0	16.0	24	79	32	43	31			
	APR-JUL	4.0	15.0	22	75	30	41	30			
NF HUMBOLDT RIVER at Devils Gate	MAR-JUL	6.0	12.0	43	73	74	121	59			

For more information concerning streamflow forecasting ask your local SCS field office for a copy of "A Field Office Guide for Interpreting Streamflow Forecasts".

*Issued by*

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## The Following Organizations Cooperate With the Natural Resources Conservation Service in Snow Survey Work\*:

<b>Canada</b>	Ministry of the Environment Investigations Branch, Victoria, British Columbia
<b>State</b>	Washington State Department of Ecology Washington State Department of Natural Resources
<b>Federal</b>	Department of the Army Corps of Engineers U.S. Department of Agriculture Forest Service U.S. Department of Commerce NOAA, National Weather Service U.S. Department of Interior Bonneville Power Administration Bureau of Reclamation Geological Survey National Park Service Bureau of Indian Affairs
<b>Local</b>	City of Tacoma City of Seattle Chelan County P.U.D. Pacific Power and Light Company Puget Sound Power and Light Company Washington Water Power Company Snohomish County P.U.D. Colville Confederated Tribes Spokane County Yakama Indian Nation
<b>Private</b>	Okanogan Irrigation District Wenatchee Heights Irrigation District Newman Lake Homeowners Association

\*Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.





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